

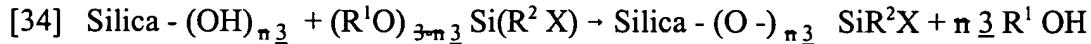
Appl. No. **TO BE ASSIGNED**

Amtd. dated May 16, 2005

Preliminary Amendment

## **AMENDMENTS TO THE SPECIFICATION**

Please replace paragraph [34] on page 8 of the published application with the following rewritten paragraph:



Please replace paragraphs [38] and [39] on page 9 of the published application with the following rewritten paragraph:

[38] → Silica - (O)<sub>3</sub> - Si - R<sup>2</sup> - (X---Y) (X' -- Y') - R<sup>3</sup> - Si - (O)<sub>3</sub> - Silica + X"Y"

[39] where X and Y are reactive functional groups which can form bridge chains. If X is chlorine atom, Y can be amine or mercapto group, X' -- Y' denotes the chemical bond formed in the reaction of X and Y functional groups and X"Y" denotes the eliminating product from the reaction.

Please replace paragraph [50] on page 11 of the published application with the following rewritten paragraph without indentation:

[50] +. The coupling of silane on silica can be confirmed by thermogravimetric analysis carried out in air stream. In general, silica showed a weight loss around 100 °C due to the desorption of water. No further weight loss was observed below 1,000 °C. However, silane-coupled silica showed a weight loss around 250 °C. Carbon and hydrogen of silane burned out in air, brought about a significant weight loss. The weight loss around 250 °C was observed on networked silica similarly to silane-coupled silica, informing the content of bridge chains.

Please replace paragraph [84] on page 19 of the published application with the following rewritten paragraph:

[84] The increases in tensile properties of rubber compounds by the addition of networked silica were considerable, regardless of the content of bridge chains as shown in Table 3. Tensile strength of rubber compounds reinforced with the N-GP(x)MP(x)-SIL networked silica was high

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around 14,7 MPa, even though the content of bridge chains varied as 0.2, 0.5 and 1.0 nmol/g. These results claimed the sufficient content of bridge chains was not too much, because the entanglement requires only connecting chain among silica particles to hold rubber **molecular molecule**.

Please replace paragraph [127] beginning on page 30 of the published application with the following rewritten paragraph:

[127] As the invention described above in detail, 1) the application of networked silica to rubber compounds brought about considerable increases in tensile strength and elongation at break compared to those of the rubber compounds reinforced with silica and coupling reagents, while the increase in modulus was not significant, 2) the addition of networked silica strengthened rubber compounds and reduced abrasion, 3) the networked structure and hydrophobic surface of networked silica provided exceptional dispersion of silica particles in rubber compounds, and 4) the stable structure of networked silica and the close interaction among silica particles and rubber molecules result in high thermal stability. Even though the rapid increase in the cure rates of rubber compounds due to the addition of networked silica is not desirable results, post-treatments of it with acid, amine, and epoxy materials or the addition of retarder into rubber compound can control cure rates up to proper levels. Furthermore, the amount of required silane for the preparation of networked silica is much smaller than the conventionally added silane to rubber compounds as coupling reagents, suggesting the reduction of chemical expenses by introducing networked silica. The number of silanol groups on the surface of networked silica - the adsorption sites of accelerators and activators - was considerably small compared to those on silica, and thus, the required amount of chemicals for proper cure rate and crosslinking density could be reduced. The application of networked silica to rubber compounds, in summary, enhances their tensile properties and dispersion of silica accompanying with reducing the costs for chemicals. **Increased As increasing the mixing stop and low mixing temperature, demerit of silica as a**

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reinforcing material even with silane coupling reagents can be improved by using networked silica, reducing the processing cost of rubber compounds. Also environmental problem caused by the formation of alcohol a the reaction between silanol group of silica and alkoxy group of silane during mixing, can be eliminated by using networked silica.